## New H3C Technologies Co., Ltd.

**H3C UniServer R4300 G5 (Intel Xeon Gold 5317)**

### CPU2017 License:
- **9066**

### Test Sponsor:
- New H3C Technologies Co., Ltd.

### Tested by:
- New H3C Technologies Co., Ltd.

### Test Date:
- Dec-2021

### Hardware Availability:
- Jun-2021

### Software Availability:
- Dec-2020

### SPECrate\textsuperscript{\textregistered}2017_int_base = 202

### SPECrate\textsuperscript{\textregistered}2017_int_peak = Not Run

### Software

**OS:**
- Red Hat Enterprise Linux release 8.2 (Ootpa)
  - 4.18.0-193.el8.x86_64

**Compiler:**
- C++: Version 2021.1 of Intel oneAPI DPC++/C++ Compiler Build 20201113 for Linux;
- Fortran: Version 2021.1 of Intel Fortran Compiler Classic Build 20201112 for Linux;

**Parallel:**
- No

**Firmware:**
- Version 5.39 released Nov-2021 BIOS

**File System:**
- xfs

**System State:**
- Run level 3 (multi-user)

**Base Pointers:**
- 64-bit

**Peak Pointers:**
- Not Applicable

**Other:**
- None

**Power Management:**
- BIOS and OS set to prefer performance at the cost of additional power usage.

### Hardware

<table>
<thead>
<tr>
<th>Program</th>
<th>Copies</th>
<th>SPEC\textsuperscript{\textregistered}2017_int_base (202)</th>
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<td>502.gcc_r</td>
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</tbody>
</table>

### CPU Name:
- Intel Xeon Gold 5317

### Max MHz:
- 3600

### Nominal:
- 3000

### Enabled:
- 24 cores, 2 chips, 2 threads/core

### Orderable:
- 1.2 chips

### Cache L1:
- 32 KB I + 48 KB D on chip per core

### L2:
- 1.25 MB I+D on chip per core

### L3:
- 18 MB I+D on chip per chip

### Other:
- None

### Memory:
- 512 GB (16 x 32 GB 2Rx4 PC4-3200AA-R, running at 2933)

### Storage:
- 1 x 600GB 10000RPM SAS HDD

### Other:
- None

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Standard Performance Evaluation Corporation (info@spec.org)

https://www.spec.org/
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### Results Table

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**SPECrate®2017_int_base = 202**  
**SPECrate®2017_int_peak = Not Run**

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

### Submit Notes

The numactl mechanism was used to bind copies to processors. The config file option 'submit' was used to generate numactl commands to bind each copy to a specific processor. For details, please see the config file.

### Operating System Notes

Stack size set to unlimited using "ulimit -s unlimited"

### Environment Variables Notes

Environment variables set by runcpu before the start of the run:

```
LD_LIBRARY_PATH = 
"/home/speccpu/lib/intel64:/home/speccpu/lib/ia32:/home/speccpu/je5.0.1-32"

MALLOCCONF = "retain:true"
```

### General Notes

Binaries compiled on a system with 1x Intel Core i9-7980XE CPU + 64GB RAM memory using Red Hat Enterprise Linux 8.1

NA: The test sponsor attests, as of date of publication, that CVE-2017-5754 (Meltdown) is mitigated in the system as tested and documented.

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5753 (Spectre variant 1) is mitigated in the system as tested and documented.

*(Continued on next page)*
General Notes (Continued)

Yes: The test sponsor attests, as of date of publication, that CVE-2017-5715 (Spectre variant 2) is mitigated in the system as tested and documented.
Transparent Huge Pages enabled by default
Prior to runcpu invocation
Filesystem page cache synced and cleared with:
sync; echo 3>/proc/sys/vm/drop_caches
runcpu command invoked through numactl i.e.:
numactl --interleave=all runcpu <etc>

Platform Notes

BIOS Settings:
Set SNC (Sub NUMA) to Enabled
Set Power Performance Tuning to BIOS Controls EPB
Set Energy Performance BIAS to Performance
Set XPT Prefetch to Enabled

Sysinfo program /home/spec/cpu2017/bin/sysinfo
Rev: r6622 of 2021-04-07 982a61ec9155bf5891ef0e16adafc64d
running on localhost.localdomain Mon Dec 13 20:33:40 2021

SUT (System Under Test) info as seen by some common utilities.
For more information on this section, see
https://www.spec.org/cpu2017/Docs/config.html#sysinfo

From /proc/cpuinfo
model name : Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
  2 "physical id"'s (chips)
  48 "processors"
cores, siblings (Caution: counting these is hw and system dependent. The following excerpts from /proc/cpuinfo might not be reliable. Use with caution.)
cpu cores : 12
  siblings : 24
  physical 0: cores 0 1 2 3 4 5 6 7 8 9 10 11
  physical 1: cores 0 1 2 3 4 5 6 7 8 9 10 11

From lscpu from util-linux 2.32.1:
Architecture: x86_64
CPU op-mode(s): 32-bit, 64-bit
Byte Order: Little Endian
CPU(s): 48
On-line CPU(s) list: 0-47
Thread(s) per core: 2
Core(s) per socket: 12
Socket(s): 2
NUMA node(s): 4
Platform Notes (Continued)

Vendor ID:       GenuineIntel
CPU family:      6
Model:           106
Model name:      Intel(R) Xeon(R) Gold 5317 CPU @ 3.00GHz
Stepping:        6
CPU MHz:         3400.000
CPU max MHz:     3600.0000
CPU min MHz:     800.0000
BogoMIPS:        6000.00
Virtualization:  VT-x
L1d cache:       48K
L1i cache:       32K
L2 cache:        1280K
L3 cache:        18432K
NUMA node0 CPU(s): 0-5,24-29
NUMA node1 CPU(s): 6-11,30-35
NUMA node2 CPU(s): 12-17,36-41
NUMA node3 CPU(s): 18-23,42-47
Flags:           fpu vme de pse tsc msr pae mca cmov
apti pse36 clflush dts acpi mmx fxsr sse sse2 ss ht tm pbe syscall nx pdpte1gb
dts rdtscp lm constant_tsc arch_perfmon pebs bts rep_good nopl xtopology
nonstop_tsc cpuid
aperfmpref pni pclmulqdq dtes64 monitor ds_cpl vmx smx est tm2 ssse3 sdbg fma cx16
xtpr pdcm pcid dca sse4_1 sse4_2 x2apic movbe popcnt tsc_deadline_timer aes
taxi f16c rdrand lahf_lm abm 3dnowprefetch cpuid_fault epb cat_l3 invpcid_single ssbd
mba ibrs ibpb stibp ibrs_enhanced tpr_shadow vni flexpriority ept vpid fsgsbase
tsc_adjust bm1 hle avx2 smep bmi2  erms invpcid rtm cqm rdt_a avx512f avx512dq
rsseed adx smap avx512ifma clflushopt clwb intel_pt avx512cd sha ni avx512bw
avx512vl xsaveopt xsaves xgetbv1 xsaves cqm_llc cqm_occmp_llc cqm_mbms_total
ckm_local whnoinvoke dtherm ida arat pln pts hwp hwp_act_window hwp_epp
hwp_pkg_req avx512vmbi umip pku ospke avx512_vbmi2 gfni vaes vpclmulqdq avx512_vnni
avx512_bitalg tme avx512_vpopcntdq 1a57 rdpid md_clear pconfig flush_lid
arch_capabilities

/proc/cpuinfo cache data
  cache size : 18432 KB

From numactl --hardware
WARNING: a numactl 'node' might or might not correspond to a physical chip.
  available: 4 nodes (0-3)
  node 0 cpus: 0 1 2 3 4 5 24 25 26 27 28 29
  node 0 size: 128197 MB
  node 0 free: 127072 MB
  node 1 cpus: 6 7 8 9 10 11 30 31 32 33 34 35
  node 1 size: 129021 MB
  node 1 free: 128763 MB
  node 2 cpus: 12 13 14 15 16 17 36 37 38 39 40 41
  node 2 size: 129021 MB

(Continued on next page)
<table>
<thead>
<tr>
<th>Platform Notes (Continued)</th>
</tr>
</thead>
<tbody>
<tr>
<td>node 2 free: 128871 MB</td>
</tr>
<tr>
<td>node 3 cpus: 18 19 20 21 22 23 42 43 44 45 46 47</td>
</tr>
<tr>
<td>node 3 size: 128991 MB</td>
</tr>
<tr>
<td>node 3 free: 128822 MB</td>
</tr>
<tr>
<td>node distances:</td>
</tr>
<tr>
<td>0: 10 11 20 20</td>
</tr>
<tr>
<td>1: 11 10 20 20</td>
</tr>
<tr>
<td>2: 20 20 10 11</td>
</tr>
<tr>
<td>3: 20 20 11 10</td>
</tr>
</tbody>
</table>

From /proc/meminfo
- MemTotal: 527596096 kB
- HugePages_Total: 0
- Hugepagesize: 2048 kB

/sbin/tuned-adm active
- Current active profile: throughput-performance

/sys/devices/system/cpu/cpu*/cpufreq/scaling_governor has performance

From /etc/*release* /etc/*version*
- os-release:
  - NAME="Red Hat Enterprise Linux"
  - VERSION="8.2 (Ootpa)"
  - ID="rhel"
  - ID_LIKE="fedora"
  - VERSION_ID="8.2"
  - PLATFORM_ID="platform:el8"
  - PRETTY_NAME="Red Hat Enterprise Linux 8.2 (Ootpa)"
  - ANSI_COLOR="0;31"
- redhat-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
- system-release: Red Hat Enterprise Linux release 8.2 (Ootpa)
- system-release-cpe: cpe:/o:redhat:enterprise_linux:8.2:ga

uname -a:
- Linux localhost.localdomain 4.18.0-193.el8.x86_64 #1 SMP Fri Mar 27 14:35:58 UTC 2020
- x86_64 x86_64 x86_64 GNU/Linux

Kernel self-reported vulnerability status:
- CVE-2018-12207 (iTLB Multihit): Not affected
- CVE-2018-3620 (L1 Terminal Fault): Not affected
- Microarchitectural Data Sampling: Not affected
- CVE-2017-5754 (Meltdown): Not affected
- CVE-2018-3639 (Speculative Store Bypass): Mitigation: Speculative Store

(Continued on next page)
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SPECrate®2017_int_base = 202
SPECrate®2017_int_peak = Not Run

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Platform Notes (Continued)

Bypass disabled via prctl and seccomp
Mitigation: usercopy/swaps barriers and __user pointer sanitation
CVE-2017-5753 (Spectre variant 1):
CVE-2017-5715 (Spectre variant 2): Mitigation: Enhanced IBRS, IBPB: conditional, RSB filling
CVE-2020-0543 (Special Register Buffer Data Sampling): No status reported
CVE-2019-11135 (TSX Asynchronous Abort): Not affected

run-level 3 Dec 13 20:22
SPEC is set to: /home/speccpu
Filesystem            Type  Size  Used Avail Use% Mounted on
/dev/mapper/rhel-home xfs   504G  146G  358G  29% /home

From /sys/devices/virtual/dmi/id
Product Family: Rack

Additional information from dmidecode 3.2 follows. WARNING: Use caution when you interpret this section. The 'dmidecode' program reads system data which is "intended to allow hardware to be accurately determined", but the intent may not be met, as there are frequent changes to hardware, firmware, and the "DMTF SMBIOS" standard.

Memory:
16x Micron 36ASF4G72PZ-3G2E7 32 GB 2 rank 3200, configured at 2933
16x NO DIMM NO DIMM

BIOS:
BIOS Vendor: American Megatrends International, LLC.
BIOS Version: 5.39
BIOS Date: 11/17/2021
BIOS Revision: 5.22

(End of data from sysinfo program)

---

Compiler Version Notes

================================================================================
C       | 500.perlbench_r(base) 502.gcc_r(base) 505.mcf_r(base)
| 525.x264_r(base) 557.xz_r(base)
================================================================================

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

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SPEC CPU®2017 Integer Rate Result

New H3C Technologies Co., Ltd.
H3C UniServer R4300 G5 (Intel Xeon Gold 5317)

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### Compiler Version Notes (Continued)

```
C++     | 520.omnetpp_r(base) 523.xalancbmk_r(base) 531.deepsjeng_r(base) 541.leela_r(base)
```

Intel(R) oneAPI DPC++/C++ Compiler for applications running on Intel(R) 64, Version 2021.1 Build 20201113
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

```
Fortran | 548.exchange2_r(base)
```

Intel(R) Fortran Intel(R) 64 Compiler Classic for applications running on Intel(R) 64, Version 2021.1 Build 20201112_000000
Copyright (C) 1985-2020 Intel Corporation. All rights reserved.

### Base Compiler Invocation

C benchmarks:
- icx

C++ benchmarks:
- icpx

Fortran benchmarks:
- ifort

### Base Portability Flags

```
500.perlbench_r: -DSPEC_LP64 -DSPEC_LINUX_X64
502.gcc_r: -DSPEC_LP64
505.mcf_r: -DSPEC_LP64
520.omnetpp_r: -DSPEC_LP64
523.xalancbmk_r: -DSPEC_LP64 -DSPEC_LINUX
525.x264_r: -DSPEC_LP64
531.deepsjeng_r: -DSPEC_LP64
541.leela_r: -DSPEC_LP64
548.exchange2_r: -DSPEC_LP64
557.xz_r: -DSPEC_LP64
```
# SPEC CPU®2017 Integer Rate Result

New H3C Technologies Co., Ltd.  
H3C UniServer R4300 G5 (Intel Xeon Gold 5317)

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## SPECrate®2017_int_base = 202

SPECrate®2017_int_peak = Not Run

### Base Optimization Flags

**C benchmarks:**

- `-w -std=c11 -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math`
- `-flto -mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin -lqkmalloc`

**C++ benchmarks:**

- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ffast-math -flto`
- `-mfpmath=sse -funroll-loops -qopt-mem-layout-trans=4`
- `-mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin -lqkmalloc`

**Fortran benchmarks:**

- `-w -m64 -Wl,-z,muldefs -xCORE-AVX512 -O3 -ipo -no-prec-div`
- `-qopt-mem-layout-trans=4 -nostandard-realloc-lhs -align array32byte`
- `-auto -mbranches-within-32B-boundaries`
- `-L/opt/intel/oneapi/compiler/2021.1.1/linux/compiler/lib/intel64_lin -lqkmalloc`

The flags files that were used to format this result can be browsed at:


You can also download the XML flags sources by saving the following links:


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For questions about this result, please contact the tester. For other inquiries, please contact info@spec.org.

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Originally published on 2022-01-07.